

What is claimed is:

1. An armature comprising:

a rotor core that includes a plurality of teeth, each of which extends in a radial direction of the rotor core;

a plurality of winding wires, each of which is wound around a corresponding one of the teeth;

at least one insulator arrangement that electrically insulates between the rotor core and the winding wires; and

at least one protective member that is provided to the rotor core to protect the rotor core from mechanical damage.

2. The armature according to claim 1, wherein the at least one protective member is made of a synthetic resin material.

3. The armature according to claim 1, wherein at least one of the at least one protective member is integrated with at least one of the at least one insulator arrangement.

4. The armature according to claim 1, further comprising a rotatable shaft that is connected to the rotor core, wherein:

the rotor core further includes a through hole that axially penetrates through the rotor core and receives the rotatable shaft therethrough; and

the at least one protective member includes at least one tubular portion, into which the rotatable shaft is press fitted, wherein the at least one tubular portion is engaged with an inner

peripheral surface of the through hole.

5. The armature according to claim 4, wherein each tubular portion includes a plurality of slits, each of which extends in an axial direction of the armature.

6. The armature according to claim 4, wherein the rotatable shaft includes a plurality of recesses that are formed in a portion of an outer peripheral surface of the rotatable shaft, which contacts the at least one tubular portion, wherein the recesses extend in an axial direction of the armature and are spaced from one another in a circumferential direction of the armature.

7. The armature according to claim 4, wherein the at least one tubular portion includes two tubular portions which are spaced from one another in an axial direction of the armature.

8. The armature according to claim 1, wherein the at least one protective member includes at least one disk portion, each of which engages a corresponding one of two opposed axial end surfaces of the rotor core.

9. The armature according to claim 8, wherein:

one of the rotor core and each disk portion has at least one first type engaging portion; and

the other one of the rotor core and each disk portion has

at least one second type engaging portion, each of which engages a corresponding one of the at least one first type engaging portion in a circumferential direction and a radial direction of the armature.

10. The armature according to claim 1, wherein the rotor core includes:

a first core member, which includes:

a first half of the plurality of teeth; and

one of at least one fitting recess and at least one fitting portion, which engages the at least one fitting recess; and

a second core member, which engages the first core member and includes:

a second half of the plurality of teeth; and

the other one of the at least one fitting recess and the at least one fitting portion, wherein at least one of opening end edges of the at least one fitting recess and end edges of the at least one fitting portion is chamfered.

11. The armature according to claim 1, wherein each tooth includes an extended portion that protrudes from the rest of the tooth in a circumferential direction of the armature, and at least one of two opposed circumferential end edges of the extended portion of each tooth is chamfered.

12. The armature according to claim 1, wherein:

the at least one protective member is made of a magnetic metal plate material; and

the at least one insulator arrangement includes a dielectric layer coated on a surface of each protective member.

13. The armature according to claim 1, wherein the rotor core is made from magnetic powder by compression molding.

14. The armature according to claim 1, wherein:

the at least one insulator arrangement includes a plurality of insulator arrangements, which are provided to the teeth, respectively; and

each insulator arrangement includes a first insulator part and a second insulator part, which are installed to the corresponding tooth in an axial direction of the armature and are opposed to one another in the axial direction of the armature.

15. The armature according to claim 1, wherein the at least one insulator arrangement includes an insulator arrangement that has first side part and a second side part, which are opposed to one another in an axial direction of the armature and hold the plurality of teeth therebetween.